

THE HISTORY OF DIPHTHERITIC PARALYSIS.

FROM A THESIS.

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Diphtheria, like any acute disease, may be associated with paralysis in various ways; an attack of convulsions may be the first symptom of its presence, or the mode of its fatal termination; an epileptic fit, perhaps the first of a series, may occur at its commencement; hemiplegia may seriously complicate its course, or it may be a predisposing or determining factor in the causation of myelitis or some specific form of paralysis.

But diphtheria is the only acute disease that is followed by a paralysis so frequent in its succession, so typical in its form, and so characteristic in its course and development, that its direct connection with the primary disease is as universally admitted as that of another form of palsy with lead-poisoning, and the paralysis is considered a symptom rather than a sequela of the disease.

The identity of diphtheria with the Syrian ulcer of Aretæus¹ can hardly be doubted, and we have accounts of many epidemics of malignant angina, under various names, since his time; but the allusions to paralysis in connection with the disease are much less common in these accounts than the number of cases now met with would lead one to expect. Such paralyzes, when they did occur, may have been attributed to organic disease of the brain or spinal cord, or set down as obscure affections of the nervous system unconnected with the angina; but it seems more probable, as suggested by Trousseau, that the number of cases now noticed does not depend entirely on the increased attention directed towards them, but is partly due to the fact that the diphtheria has now assumed a more toxic character than it formerly possessed.

Various passages in Hippocrates have been pointed out as having more or less bearing upon the symptoms of diphtheria.

In 1861 Littré drew the attention of the French Academy to the account given of an epidemic cough at Perinthus.² This cough was followed by a relapse, in which, if the cough had been slight, the patients, especially children, had nyctalopia; but if the cough was violent and dry, or with the expectoration of hard dry matters, it was followed by angina and paralysis.

Littré suggested that, wide as the signification of the term angina or cynanche was to the ancients, in view of the peculiar character of the expectoration in some of these anginas, *e.g.*, in Cyniscus' patient, in whom "the throat was clean after he had got rid of some large matured spits," it was not unreasonable to suppose the affection to have been a membranous one.³

Aretæus of Cappadocia, a contemporary of Vespasian (A.D. 69). whose description of the Syrian or Egyptian ulcer I have referred to, makes no mention of any paralytic symptoms, but about the beginning of the second century there lived at Rome, during the times of the Emperors Trajan and Hadrian, a Greek physician, Soranus of Ephesus, some of whose writings are extant in the original. His treatise, *περί ὀξέων παθῶν καὶ περί χρόνέων παθῶν*,⁴ is known to us only in the Latin version of Cælius Aurelianus Siccensis, about four hundred years later, but in it we for the first time meet with such symptoms as "vocis amputatio," "loquutio non articulata," "recursus poti liquoris," and "caninus vocis sonitus" in connection with angina.

Ætius Amidenus,⁵ a Christian physician of Byzantium, writing about the end of the fifth or early in the sixth century, gives a good description of the Egyptian or Syrian ulcer, and is a little more definite about the paralysis. He says of sufferers from this complaint—

*φθέγγονται μὲν στεγνώτερον καὶ πινόμενόν τὸ
πόμα αὐτοῖς ἐπανακάμπτεται εἰς τὰς ρίνας.*

From this time there is a great gap in the history of this paralysis; it is not mentioned by any of the Arabian physicians, and we do not find anything bearing on the matter till we come to Nicolas Lepois.⁶

In his account of angina he says: "Difficulus deglutiant . . . idque proprie cum potus eis per nares reflat. Vox impedita nihil significat et qualis catulorum est. . . . Potui datus per nares remeat, . . . vidit auditque obtuse." But he seems here to be speaking of the malignant form of laryngeal diphtheria just before its fatal termination on the first, second, third, or at latest on the fourth day. Further on he alludes to the expectoration, "quod inter potandum per tussim emerget."

In the chapter on paralysis he writes: "Paralyticis ab angina non totum corpus resolvitur sed usque ad manus duntaxat;" but he also describes as one of the forms of angina "ea specie quæ fit lnxatis ad anteriores partes vertebrae."

In 1615 Perez de Herrera pointed out that convalescents from this disease are apt to speak indistinctly, but that their troubles, unlike the similar ones of syphilis, soon disappear.

Carnevali, writing in 1620, speaks of the persistent alterations of the voice, which are also mentioned in 1636 by that *Ætius Cletus Signinus*⁷ whom Fothergill quotes.

Severinus⁸ mentions cases of sudden and unexpected deaths of convalescents as late as the thirtieth or fortieth day, and Bellini⁹ also speaks of paralysis in connection with angina, and of food being returned through the nostrils, though the passages perhaps do not refer to diphtheritic angina.

The next reference to paralytic symptoms is that by Ghizi,¹⁰ in a work which has been quoted by most writers on diphtheria since Bretonneau cited him as an authority. Writing of his own son's case, he says: "We left to nature the care of repairing the strange effects of this malady, effects which were noticed in many cases already convalescent, and which persisted about a month after the cure of the angina and abscess."

In 1747 Malouin¹¹ gave an admirable description of the angina prevalent in Paris in the preceding years, and of the paralysis connected therewith; and in 1749 Chomel¹² mentioned the case of a girl, 6½ years old, who was not really convalescent till the forty-fifth day, continuing to talk with difficulty, speaking through her nose, and having a pendulous uvula; and of another case writes: "I have since heard that after the fortieth day she spoke decidedly through her nose, and had become squint-eyed and deformed. She gradually recovered."

Fothergill,¹³ in 1748, writes: "Those who survived the fourteenth day were thought to be out of danger, at least from the disease itself, though some dropped off unexpectedly after a much longer reprieve, and the consequences of this disease were often felt a long time after it had ceased; an excessive languor and weakness continued for many months, and the voice or deglutition was frequently affected, so as to be perceivable in some almost a year after."

Neither Starr,¹⁴ Wall, nor Huxham allude to any paralytic symptoms.

In 1768 there was an epidemic of gangrenous sore throat at Annale, in describing which Marteau de Grandvilliers¹⁵ speaks of hemeralopia, the return of fluids through the nose, and a hoarse and nasal voice.

Samuel Bard,¹⁶ of New York, whose work on sore throat was quoted by Bricheteau and Bretonneau, mentions a girl of 2½ years, in whom there was dysphagia and aphonia, and such paresis of the lower limbs that at the end of two months she could hardly walk; in another case he remarked a peculiar sensibility of the larynx with regard to fluids, so that the moment she attempted to drink she fell into a fit of coughing, although she could swallow solid food without difficulty.

From the beginning of this century the mention of paralytic symptoms in connection with gangrenous angina becomes more common. According to Sanné, paralytic symptoms were mentioned in 1809 by Jurine of Geneva and Albers of Bremen, and paralysis of the velum and fauces was seen by Sedillot¹⁷ in 1810, after a catarrhal (!) affection of the pharynx. In the same year Pinel recorded an instance of marasmus after gangrenous sore throat in a girl of 25, accompanied by continued agitation and spasms of most of the voluntary muscles, a very distressing constriction of the throat and an inability to swallow, the liquids passing out of the nostrils. The patient also suffered from pains and singing in the ears. Recovery of deglutition in fourteen days, of marasmus in six weeks.

Hoffmann,¹⁸ in 1815, saw a severe case of diphtheria followed by loss of smell, almost total blindness, heaviness of the limbs, and a tottering gait.

Guimier de Vouvray,¹⁹ in describing an epidemic in 1828, says: "The voice, sight, and lower extremities were affected in many sick in whom the respiratory passages escaped (and in one child of ten who had had croup), and these affections persisted two or three months."

Bretonneau did not lay any stress on paralytic symptoms in his earlier writings, and it was not till Orillard²⁰ published an account of an epidemic in La Vienne in the years 1834-35, that a comprehensive view of the symptoms of generalised and extensive paralysis in direct connection with malignant angina was given to the medical world. In spite of his graphic description of the paralysis, and the prevalence of diphtheria in France, not very much attention was paid to this sequela of the disease till Trousseau and Laségue, in 1851,²¹ published a short paper on paralysis of the soft palate, and Maingault, who submitted a thesis on the same subject in 1854, in 1859 placed the matter before the Medical Society of the Paris Hospitals in his now well-known work.²² It seems remarkable that Trousseau, though he must have been acquainted with Ghizi's letter and the cases mentioned by Bard from Bretonneau's notice of them,²³ and though he had himself seen several well-marked

cases, including that of Dr. Herpin, did not, as he himself tells us, begin to look upon diphtheritic paralysis in the same way as Bretonneau till about the year 1852.

The attention aroused by Maingault's paper was not allowed to subside; very shortly after its appearance Gubler offered to the same Society a communication on the connection of paralysis with all acute diseases, in which he maintained that there was nothing in any way specific in the form which occurs after diphtheria, and that paralysis of the same kind occurred after simple anginas, pneumonia, typhoid fever, and acute diseases in general.

I have given a *résumé* of Gubler's conclusions in the Appendix, and his views will call for further consideration in regard to the pathogenesis of diphtheritic paralysis. They were opposed by Colin and Sée in papers presented to the same Society, and by Trousseau; but, specific or not, diphtheritic paralysis had become a well-known disorder. An abstract from an editorial in the *Gazette des Hôpitaux* describes it as it was then recognised. For the purpose of this essay I would submit the following definition:—

“The paralysis usually associated with diphtheria is one which, in most cases, comes on during convalescence, its onset is gradual, and the soft palate and pharynx are the first parts affected, but it is prone to attack other parts in an order that, if not absolutely constant, is yet so uniform as to be an important element in diagnosis; it exhibits a marked tendency to symmetry; it usually affects sensation as well as motion; it is hardly ever complete in the sense of affecting every part of the body, and is more often a paresis than an absolute paralysis; and, though it occasionally proves fatal by interfering with nutrition, by involving the heart or respiratory muscles, or by some accident or intercurrent disease, as a rule it terminates in recovery.”

APPENDIX.

¹ Aretoei Cappadocis, *De causis et signis acutorum et diuturnorum morborum libri quatuor*, &c. Edited by Boerhaave. Lugduni, 1731, f. ii. L. i. c. 9, p. 7. Part of the passage is given by Bretonneau, N.S.S., 1859, p. 28.

² Littré, Hippocrates, t. v. p. 335, and t. x. i. Littré's communication to the Academy was on June 8, 1861, but Ch. Ravel, in *L'Art Medical*, November 1860, had previously drawn the attention of the profession to the same point. See *Gaz. Med. de Paris*, 1863, p. 530.

³ Cælius Aurelianus Siceensis, *De acutis morbis*, &c. Lugduni, 1567. 8vo.

⁴ Ætius Amidennus, *Tetrabiblion* II. Sermo IV. cap. xlvi. Venetii, 1534, fol. For the passage in the text see βιβλίον ὀγδοὸν μδ. The passage is quoted in Hirsh's *Handbook of Geographical and Historical Pathology*.

⁵ Piso (Nicolaus), *De cognoscendis . . . morbis*. Francofurti, 1580, fol. pp. 164 and 58.

This Nicolas Lepois of Nancy was physician to Duke Charles III. of Lorraine. See also the same work, preface by Boerhaave, Leyden, 1736, 2nd edit. L. i. c. xvii. *De paralyti*, p. 112, and L. ii. c. iii. *De angina*, p. 310.

⁶ Perez de Herrera, *De . . . garotillo*. Madrid, 1615.

⁷ Carnevalis (Johannes Baptista), *De epidemico strangulatorio affectu*, &c. Neapoli, 1620, 4to, p. 103.

The work is interesting. He believes in the influences of the stars, and quotes freely, not only medical writers, but also Thucydides, Ovid, and Lucretius, *e.g.* :—

“Inde nbi per fauces pectus complerat et ipsum,
Morbida vis in cor mæstum confluxerat ægris
Omnia tum vero vitæ claustra lababant.”

Ætius Cletus Signinus, *De morbo strangulatorio*, Roma, 1636, c. i. ad finem: “Ex iis qui pristinam valetudinem consequuntur, anni plus minusve spatium, omnes fere müssitant et verba difficulter efferunt” (c. xii. 5). “Qui demum convalescebat ex hoc morbo diuturniori temporis spatium müssitabat et, ut ita loquar, per nares loquebatur non alia de causa quam quod sphacelo palatus carne nudabatur, et lingua sermonis præcipuum instrumentum illius partis commodo subsidio destituebatur quamobrem müssitatio tam diu durabat quamdiu palatus carne non replebatur et pristinam formam non acquirebat.”

⁸ Marcus Aurelius Severinus of Naples, in the tract, “*Pædanchone Loimoides seu de pestilente ac præsocante Pueros abscessu*,” annexed to the second edition of his work, “*De recondita abscessuum natura*,” 1643, p. 440 (or Lugduni, 1724, p. 529).

“Quinino post XXX dies et XL jam prærepti morbi furoribus, præter

omnium opinionem, ex improvise sunt extincti. Adeo scilicet latitans et recondita veneni vis est."

⁹ Bellini (Lorenzo), "De urinis et pulsibus," 1685, 4to, p. 655, Francofurti et Lipsiæ: "Quælibet deglutiendæ ad palatum perductæ . . . reddentur per nares quæ si fiant etiam tolletur motus, et æger converti non poterit, sicut etiam in aliquibus partibus puta brachiis ac pectore tolli poterit motus et sensus."

¹⁰ Ghizi, Lettere Mediche, Cremona, 1749. The abscess was below the right angle of the jaws, and pointed under the sterno-mastoid muscle.

P. 20.—*Reflessiona settima*.—"Il parlar pel naso, e l'escirne di frequente il cibo, sono stati effetti da me osservati in parecchi per lo spazio d'un mese in circa dopo la gnarigion totale della loro angina alle fauci."

He suggests as the cause the injured form, substance, and tone of the tonsils, uvula, and soft palate, which had not had time to recover, and says that in such cases he always found the uvula and tonsils smaller than usual.

¹¹ Malouin, Mémoires de l'Académie Royale des Sciences, 1747: "La même humeur a fait aussi des paralysies qui n'attaquaient que les extrémités et qui n'étaient point précédées d'apoplexies. Ces paralysies avaient encore ceci de particulier que les parties qui en étaient affectées revenaient quelquefois dans leur état naturel lorsque en même temps une autre partie tombait paralytique."

Severinus in 1618 noted the appearance in cattle of a morbus strangulatorius at the time of the local epidemics of malignant quinsy; so here Malouin.

¹² In his dissertation on gangrenous sore throat (translation by N. Torriano, M.D., dedicated to Dr. William Pitcairn, of St. Bartholomew's Hospital, London, 12mo, 1753). The word *contrefaite*, here translated as "deformed," is commonly applied to cases of lateral curvature of the spine.

¹³ Fothergill, John, M.D., An Account of the Sore Throat attended with Ulcers. 2nd edit. London, 1748, p. 17.

At p. 56 he gives a case of a girl of 9, in whom on the third day the stools and urine came away insensibly. She recovered; but this case was probably scarlet fever. At p. 63 he speaks of the danger of sickness, vomitings, and excessive faintness.

¹⁴ Starr, J., Of the Morbus Strangulatorius, Philos. Tr. xlv. p. 1750; he gives a remarkable plate of a bifurcating false membrane.

Wall, M.D., of Worcester, Gentleman's Magazine, 1751, p. 497.

Huxham, John, A Dissertation on the Malignant Ulcerous Sore Throat, 1757.

¹⁵ Martean de Grandvilliers, Description des maux de gorge épidémiques et gangreneux, Paris, 1768, 12mo.

He also mentions vomitings, and the restoration of the voice by slow degrees, &c.; but he must have taken Ghizi's view of the cause, as he speaks of "un ulcère si rongéant qu'il avait détruit la luvette de sorte que deux mois après, les aliments revenoient encore par le nez" (p. 35). Some of his cases were scarlet fever. Besides the eruption, he speaks of "une bouffissure universelle, anasarca, hydropisie de poitrine et l'ascite." He gives drawings of membranous casts from the trachea.

¹⁶ Samuel Bard, *Researches on the Nature and Cure of Sore Throat*, New York, 1771, 8vo, and *Am. Phil. Trans.*, vol. i.

¹⁷ The account of Sédillot's case is given in the *Jour. Gen. de Méd.*, t. xl. p. 181. He particularly states that such paralysis of the organs of deglutition is uncommon, and alludes to Pinel's case, which is given in the article on Spasm in the *Dict. des Sciences Médicales*, Paris, 1812.

¹⁸ Angina Tonsillaris, &c. mit nachfolgender Lähmung einiger Sinnorgane, von John Fr. Hoffman, in Bernberg. *Magazin für die gesammte Heilkunde* (Rust's). 1831.

Auguste H——, 9. 1st December 1815.—Deafness and loss of smell, and almost total blindness. 12th.—“Allem der Nasenton beim Sprechen und das Athmen durch die Nase blieb gleich beschwerlich” (after the separation of several hard crusts), p. 257. 13th.—Great increase in general weakness; loss of sight noticed on the 11th. 17th.—Almost completely blind, p. 359. “Schwere in der Gleidern, unsicherer Gang: der Nasenton beim sprechen minderte sich erst-später.” Taste returned in the course of February, hearing in March (p. 364), and on the 29th April she cried out with pleasure on finding out that she could read the big letters on the title of a song-book on which her eyes accidentally fell (p. 365).

¹⁹ *Mémoire sur une épidémie d'angine maligne ou diphthéritique, qui a régné à Vouvray et dans les communes voisines, à la fin de 1826 et dans le courant de 1827*, par M. Guimier, D.M. a Vouvray (Indre-et-Loire). *Jour. Gen. de Med.*, 1828, t. civ. p. 165 *et seq.*

²⁰ Orillard (A.) of Poitiers. *Mémoire sur l'épidémie d'angine couenneuse qui a régné pendant le cours des années 1834, 1835, et 1836, dans plusieurs communes du département de la Vienne*. *Bull. Soc. de Med. de Poitiers*, 1837, II. i. 112.

“Quelques malades conservent longtemps beaucoup de gêne dans l'acte de déglutition; d'autres restent frappés de surdité ou de l'amaurose; enfin des désordres plus graves ont été observés dans le système de l'innervation. Toute altération avait cessé du côté de la gorge, les fonctions digestives avaient repris leur activité ordinaire, le sommeil était régulier; mais les fonctions locomotrices ne se rétablissaient pas, les mouvements de préhension ne pouvaient s'exécuter qu'avec un tremblement considérable, les doigts étaient incapables d'exercer le moindre pression. Les malades, s'ils essayaient quelques pas, chancelaient comme pris d'ivresse, et avaient besoin d'être soutenus pour éviter la chute; quelqu'uns ressentaient de vives douleurs dans les membres. Ces symptômes persistaient quelquefois pendant plusieurs mois pour disparaître graduellement. Chez les sujets affaiblis par l'âge ou par les privations le mort pouvait terminer ces accidents.”

Loyauté, Thèse de Montpellier, 9 Mai 1836, gave two cases of complete blindness.

I have not been able to see the original passages, and have taken the above from Maingault.

²¹ *L'Union Med.*, 1851, p. 471. “Du nasomement et de la paralysie du voile du palais:” treating it as a local affection following a local disorder, like muscular paralysis following rheumatic or ordinary inflammation, and not connecting it in any way with symptoms of paralysis in other parts. “A view that might be taken by any one who met with paralysis of the soft palate, and was not acquainted with the general paralysis that occurs

after diphtheria, and one that may be good for some cases" (Hermann Weber).

Morisseau, p. c. p. 499, takes the same view, and gives five cases—four in adults—one persisting many years.

²² Maingault discusses in his Thesis the effects of paralysis of the soft palate upon articulation, deglutition, blowing, and suction, and does not refer to more generalised paralyses. His memoir "*Sur les Paralysies Diphthéritiques*," appeared in the *Actes de la Société Médicale des Hôpitaux de Paris* in 1861, and in the *Archives Générales de Médecine*, t. xiv. 385 and 674. His conclusions were as follows :—

(1.) Numerous observations show that a form of paralysis exists, properly to be called diphtheritic paralysis, coming on during the convalescence of pseudo-membranous affections, malignant angina, or croup, and which is clearly a consequence of the primitive affection.

(2.) This paralysis may be local, and confined to the soft palate and pharynx.

(3.) It frequently affects distant parts ; is sometimes limited to the lower limbs (paraplegia), sometimes extends to all the muscles of the body in succession, to those of the limbs, trunk, and eye, and then assumes a general and progressive form.

(4.) A mild form of angina may be followed by serious and extensive paralysis.

(5.) Albuminuria is in no way the determining cause of the paralysis, since in some cases it does not occur.

(6.) Diphtheritic paralysis seems to be the result of a disturbance of innervation, without lesion of the nervous centres.

(7.) When generalised the paralysis may end in death, but more commonly recovery takes place within a period varying from two to eight months.

²³ Bretonneau's paper on the means of preventing the development and progress of diphtheria appeared in the *Archives Générales* (on the occasion of the death of a son of Dr. Blache's), and contained the case of Dr. Herpin, and also one of a strong boy of 12 or 13, who, three months after the cure of the primary affection, had still such paralysis of sensation that "he seemed to be walking on air." In both these cases the nasal mucous membrane had been affected, a point to which Bretonneau attached much importance in relation to the paralysis.



